

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the present application.

Listing of Claims:

Claim 1 (canceled)

Claim 2 (currently amended): A method of manufacturing *n*-type semiconductor diamond, the method employing an ion-implantation apparatus having an electron-beam line and *Li* and *N* ion-beam lines, and the method comprising:

a preparatory step of providing single-crystal Type IIa or undoped epitaxial diamond essentially not containing impurities;

an implantation step of producing diamond incorporating *Li* and *N* by irradiating the diamond with the *Li* and *N* ion-beam lines simultaneously and in such a manner as to implanting into single-crystal Type IIa or undoped epitaxial the diamond essentially not containing impurities *Li* ions at a dose of at least $3.0 \times 10^{15} \text{ cm}^{-2}$ [[,]] and *N* ions at a dose such that the *Li* and *N* sum-total dose is at least $7.0 \times 10^{15} \text{ cm}^{-2}$, and so that ion-implantation depths at which the post-implantation *Li* and *N* concentrations each are at least 1600 ppm will overlap;

an irradiation step, concurrent with said implantation step, of irradiating the diamond with the electron beam to cause the implantation *Li* and *N* ions to distribute in locations within the diamond in which *Li-N* pairing is likely to occur; and

a step of annealing said diamond incorporating *Li* and *N* at a temperature in the range of from 800°C to less than 1800°C, under high-pressure conditions of at least 3 GPa so as to cause *Li* and *N* pairing to occur to the exclusion of *Li* associating

with implantation-caused vacancies in the diamond, such that the $Li-N$ pairs do not associate with vacancies but instead become electrically activated shallow donors;

whereby said diamond has a sheet resistance of not greater than 1.4×10^4

Ω/\square .

Claims 3 through 5: (canceled)

Claim 6 (currently amended): Semiconductor diamond manufactured by the n -type semiconductor-diamond manufacturing method set forth in claim 2 ~~being Type IIa, single crystal or undoped epitaxial n type, incorporating, from a crystal face thereof to the same depth, at least 1600 ppm of each of Li and N , and having a sheet resistance of not greater than $1.4 \times 10^4 \Omega/\square$.~~

Claims 7-9 (canceled)